

Patent Application
Docket No. 45688-00002USPT

REMARKS

Reconsideration and allowance are respectfully requested in view of the foregoing amendments and the following remarks.

Claims 1-14 remain pending. Claims 1-3, 6, 8-10, and 13 stand rejected under 35 USC 103(a) as being unpatentable over Hatano et al. (US Patent No. 5,998,810), hereinafter "Hatano". Claims 4- and 11-12 stand rejected under 35 USC 103(a) as being unpatentable over Hatano in view of Okazaki (US Patent No. 5,990,500). Claims 7 and 14 stand rejected under 35 USC 103(a) as being unpatentable over Hatano in view of JP 03263878A.

The principles of the present invention are generally directed to a flip-chip light-emitting device. That is, a surface of the transparent substrate 31 functions as the main light-emitting surface of the flip-chip light-emitting device. The flip-chip light-emitting device is structurally different from a prior light-emitting device which main light-emitting surface is a surface of its light-transmitting electrode 13 (see Fig. 1 of the subject application) and an edge-emitting semiconductor laser diode which main light-emitting surface is an edge surface perpendicular to the substrate layer or electrode layers. The amended Claims 1 and 8 clearly reflect the above difference.

The flip-chip light-emitting device according to the present invention has an electrode that is opposite to the main light-emitting surface (a surface of the transparent substrate 31) and has good reflectivity of light. The light directed to the electrode, therefore, can be reflected by the electrode to the outside through the transparent substrate, and thus substantially increases the light-emitting efficiency of the whole device. To the contrary, the electrode of a prior light-emitting device must not have good reflectivity of light because one of its surfaces is the main light-emitting surface and thus the electrode must be a light-transmitting electrode. As to an

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edge-emitting semiconductor laser diode, since its main light-emitting surface is perpendicular to its electrode layer, its electrode cannot function as a reflector to increase the light-emitting efficiency no matter whether the electrode has good reflectivity of light or not. The amended Claims 1 and 8 clearly reflect the above difference.

Hatano et al (U.S. Patent No. 5,998,810) "relates to a semiconductor laser and to a semiconductor light-emitting element" (see column 1, lines 15 and 16 of the specification). The embodiments of the light-emitting element, such as those illustrated in Figures 6, 7, 11A and 11B, of Hatano et al do not disclose or teach the technical features of the present invention, and thus are not mentioned by the Examiner either.

The Examiner considers that Figure 14 and the relevant disclosure of Hatano et al have disclosed the subject invention. However, the illustration of Figure 14 and its corresponding descriptions, as pointed out by the Examiner, are related to an edge-emitting semiconductor laser, instead of a flip-chip light-emitting device. It is well known in the art that the structure of an edge-emitting semiconductor laser is different from that of a flip-chip light-emitting device. From the descriptions of the embodiment illustrated in Figure 14, it is noted that in this case, the chip was formed such that the end face of laser was constituted by the A-face, i.e., (11-20) face of the GaN-based material (col. 27, lines 57-60). Apparently, the embodiment illustrated in Figure 14 of Hatano et al, the main light-emitting surface is the (11-20) face of the GaN-based material, which is perpendicular to the substrate layer 701 and the electrode layer 722. In the edge-emitting semiconductor laser device illustrated in Figure 14 of Hatano et al, the laser light is emitted to the outside in the direction into the paper of Figure 14. Since the main light-emitting surface is perpendicular to the electrode layer 722, the electrode 722 cannot function as a reflector to increase the light-emitting efficiency no matter whether the electrode 722 has good reflectivity of light or not.

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The Examiner also considers that Figure 4 and the relevant disclosure of Hatano et al have disclosed the present invention. However, the illustration of Figure 4 and its corresponding descriptions, as pointed out by the Examiner, are related to an edge-emitting semiconductor laser, instead of a flip-chip light-emitting device that includes "a transparent substrate comprising a main surface and a surface opposite to said main surface, wherein said surface opposite to said main surface is the light-emitting surface of said device" (claim 1, lines 2-4). As discussed above, the structure and electrodes of an edge-emitting semiconductor laser are different to that of the flip-chip light-emitting device of the present invention.

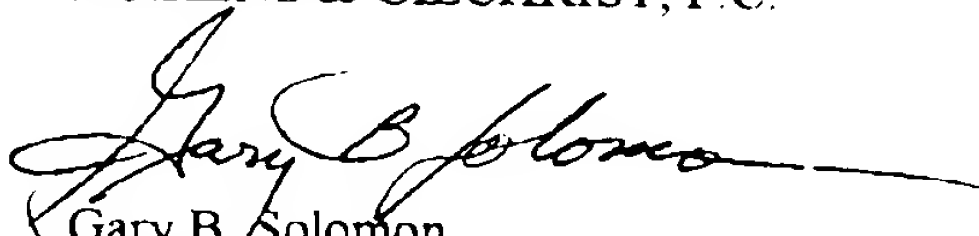
To sum up, Hatano et al neither discloses nor teaches the claimed invention of the amended claims of the subject application.

In view of the above, it is believed that this application is in condition for allowance, and such a Notice is respectfully requested.

Should the Examiner have any further questions or comments facilitating allowance, the Examiner is invited to contact Applicant's representative indicated below to further prosecution of this application to allowance and issuance.

Respectfully submitted,

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Date: April 18, 2003

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